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Variation in psychosocial influences according to the dimensions and content of children's unusual experiences: potential routes for the development of targeted interventions.

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Abstract (243 words)

The psychosocial processes implicated in the development and maintenance of psychosis differ according to both the dimensional attributes (conviction, frequency, associated distress, adverse life impact) and the content or type (e.g., grandiosity, hallucinations, paranoia) of the psychotic symptoms experienced. This has informed the development of 'targeted' cognitive behavioural therapy for psychosis (CBTp): interventions focusing on specific psychological processes in the context of particular symptom presentations. In adults, larger effect sizes for change in primary outcomes are typically reported in trials of targeted interventions, compared to those for trials of generic CBTp approaches with multiple therapeutic foci. We set out to test the theoretical basis for developing targeted CBTp interventions for young people with distressing psychotic-like, or unusual, experiences (UEs). We investigated variations in the psychosocial processes previously associated with self-reported UE severity (reasoning, negative life events, emotional problems) according to UE dimensional attributes and content/type (using an established five-factor model) in a clinically referred sample of 72 young people aged 8-14 years. Regression analyses revealed associations of conviction and grandiosity with reasoning; of frequency, and hallucinations and paranoia, with negative life events; and of distress/adverse life impact, and paranoia and hallucinations, with emotional problems. We conclude that psychological targets for intervention differ according to particular characteristics of childhood UEs in much the same way as for psychotic symptoms in adults. The development of targeted interventions is therefore indicated, and tailoring therapy according to presentation should further improve clinical outcomes for these young people.

Key words: psychotic-like experience (PLE); cognitive model; psychosis; cognitive therapy; CBT

1.0 Introduction

Unusual, or psychotic-like, experiences are changes in thinking and perception that are phenomenologically similar to the symptoms of psychosis, for example, hearing a voice that no-one else can hear [1]. The prevalence of such experiences in childhood is high (around two-thirds of the general population, by self-report) suggesting that they cannot be considered, in isolation, to reliably confer increased risk of psychosis [2]. Rather, it seems that increasing likelihood of future mental illness is determined by particular characteristics and correlates of unusual experiences (UEs), such as associated distress and adverse life events [3,4]. This is consistent with the continuum premise underpinning cognitive models of the development and maintenance of psychosis [5,6]. In these models, UEs are one of a multiplicity of biopsychosocial factors that are hypothesised to cumulatively increase the risk of developing psychosis, but are not in themselves, indicative of 'illness'. Although the degree of continuity of psychotic symptoms with normal experiences has been questioned [7], the implication that UEs occurring in the general population should be a target for intervention when they are associated with distress or impairment is less controversial. The United Kingdom National Institute for Health and Care Excellence (NICE) guideline for the treatment of psychosis in children and young people [8] recommends that cognitive behavioural therapy for psychosis (CBTp) is offered when UEs are causing distress or adverse life impact. The aim of intervention is to improve current wellbeing and potentially reduce the future risk of developing psychosis.

In adult psychosis, associated distress and life impact have been conceptualised as dimensions of psychotic experience, alongside factors such as the degree of conviction with which an unusual idea is held, and the frequency of experiences [9]. There are indications

that these dimensions, alongside the content or type of experience, may be associated with discrete and differing psychological mechanisms. Reasoning biases, such as jumping to conclusions (i.e., making hasty decisions based on insufficient evidence), have been shown to be associated with delusional conviction and grandiose content [10-13]. Emotional problems (depression and anxiety) are associated with distress and paranoid content [13-18]. Negative life events are associated, potentially through trauma and re-experiencing pathways, with increased frequency of unusual, and especially hallucinatory, experiences [19-22]. These theoretical advances have informed the development of targeted CBTp interventions that focus on changing a particular cognitive or emotional process, in the context of a particular symptom presentation. Larger effect sizes for change in primary outcomes are typically reported in trials of targeted interventions, compared to those for trials of generic, undifferentiated CBTp protocols with heterogeneous therapy foci [23-27].

In recent studies, the psychosocial factors implicated in the onset, severity, and maintenance of adult psychosis have been found to also predict the occurrence and severity of childhood UEs [28-34]. Our research has shown that cognitive, emotional and social factors each make independent contributions to overall UE severity, supporting the general applicability of CBTp to this group [30]. We have also shown that reasoning [31] and negative schematic beliefs [32] can both be assessed in children in a similar fashion to adults with psychosis, and could both form useful foci for intervention. However, it remains unclear whether childhood UEs share characteristics of dimension, and content or type, with adult symptoms of psychosis, and, if so, whether there is similar variation in associated psychosocial processes to support the development of targeted interventions.

In a large general population sample of schoolchildren aged 9-11 years, Laurens and colleagues [35, 36] found that, rather than clustering by content or type, unusual experiences (measured by nine self-report items) clustered into a single factor which was strongly associated with both internalising and externalising psychopathology. However, in a slightly older sample (12-16 years), using the positive subscale of the Community Assessment of Psychic Experiences (CAPE; twenty self-report items), Wigman and colleagues [37] identified five underlying content types. These five types (hallucinations, delusions, paranoia, paranormal thinking (belief in telepathy and mind-reading), and grandiosity), have been broadly replicated by other studies of the CAPE in adolescents [38-41], and parallel distinctions found in clinical psychosis [42]. Hallucinations and paranoia appear more likely to be distressing and associated with current and future psychopathology [43, 44], and there are preliminary suggestions that the role of schematic beliefs may vary according to UE content or type [32, 34]. No study to date has systematically examined the association of key cognitive, emotional and social processes relevant to CBTp with particular UE presentations in children.

The current study was designed to build on our earlier findings supporting the general applicability of CBTp, implicating reasoning, emotional problems and negative life events in overall UE severity [30-32], by investigating whether the influence of these cognitive, emotional and social processes differed according to particular characteristics of childhood UEs. We studied a sample of clinically referred 8-14 year olds, some of whom were also participants in our earlier research [30-32], and considered similar dimensional attributes and content/type characteristics of childhood UEs to those linked with particular psychosocial processes in studies of adult psychotic symptoms.

Based on the adult psychosis literature, we hypothesised that young people with reasoning biases, with more negative life events, and with more severe emotional problems, respectively, would be characterised by particular patterns of association with UE dimensions and content as follows:

1) reasoning biases with conviction and grandiosity;
2) negative life events with frequency and hallucinations;
3) emotional problems (anxiety and depression) with distress/impact and paranoia.

2.0 Material and methods

2.1 Participants and recruitment

Participants were recruited during the first 24 months (July 2011 through July 2013) of a larger study (ISRCTN:13766770) from the waiting list of a South London Child and Adolescent Mental Health Service (CAMHS). The service offered brief assessment and intervention for children referred with emotional and behavioural problems (such as school refusal), but not with a known mental health problem requiring the input of a specialist community mental health team. The waiting list comprised referrals that had been screened for suitability for the service, who were awaiting their first assessment. The current sample comprised the first (recruited 2011-12) and second (recruited 2012-13) cohorts, reported in a previous study of schematic beliefs [32]; the first cohort (n=40) were also previously reported in a preliminary study of UE severity [30], and, as part of a mixed clinical and non-clinical sample, in a standardisation of a reasoning task [31]. Study inclusion criteria were: age between 8 and 14 years; speaking sufficient English to complete the assessment battery; and planning to reside locally for at least 6 months (to allow participation in the larger trial). All

children meeting the inclusion criteria whose families consented to participate, and who completed a baseline assessment of unusual experiences, were included in the current study.

2.2 Measures

Demographic data (age, gender, and ethnicity) were collected from the child's primary caregiver. Self-reported ethnicity was coded as BME (any black or minority ethnic group); non-BME (white British or Irish); or other (any other ethnic group, including 'mixed'). Current intellectual functioning was estimated using age standardised scores from the British Picture Vocabulary Scale, which measures receptive vocabulary and correlates highly with verbal ability (BPVS [45]).

2.2.1 Unusual Experiences [36, 46]

This nine-item, self-report questionnaire, assesses a range of UEs, including five items adapted from the Diagnostic Interview Schedule for Children [47]. Items were rated firstly for *conviction*: 0 (not true); 1 (somewhat true); 2 (certainly true). Any endorsed item (scoring >0 on conviction) was subsequently rated for *frequency* of occurrence over the previous two weeks ('How often has it happened?') from 0 (not at all) through 1 (only once); 2 (two to four times); to 3 (five or more times). Items were then rated for associated *distress* ('How much does this upset you?') and *impact* ('How much does it make things hard at home or school?') from 0 (not at all); through 1 (only a little); 2 (quite a lot); to 3 (a great deal). Item totals were created by summing the scores for each dimensional rating (conviction, frequency, distress, and impact scores; range 0-11 per item). Item totals were then summed to create an overall UE severity score (0-99 for the full scale).

For the current study, the three UE dimension variables comprised the total scores (i.e. across all nine UE items) for conviction (possible range 0-18), frequency (possible range 0-27), and combined distress/impact (i.e. the sum of the distress and impact ratings, to capture both emotional and functional subjective interference with daily life, possible range 0-54).

The five UE content/type variables were formed from the item totals of single items or item clusters (Table 1). The content/type variables represented the five factors of adolescent UEs derived from the CAPE: hallucinations, delusions, paranoia, paranormal thinking (belief in telepathy and mind-reading), and grandiosity. CAPE factors were based on endorsement ratings (to limit the influence of associated distress/severity) of the 20 positive psychotic symptom-like items [37-41]. Hallucinations, paranoia, and paranormal/telepathy items were identified straightforwardly by content. A pragmatic confirmatory factor analysis (CFA) of dichotomized endorsement ratings (conviction 0 or >0) for the nine UE items, specifying five factors and using Direct-Oblimin rotation to accommodate inter-relationships, further suggested clustering of the three grandiose/bizarre items, with the remaining item (being sent special messages) representing 'other delusions' (see Table 1 for factor loadings of each item). Internal consistency (Cronbach's α) was calculated for each subscale comprising more than one item, and ranged from just acceptable to good (Table 1).

Table 1 here

2.2.2 Reasoning (Jumping to conclusions, JTC, on the 'Beads' task [12, 31])

Participants were shown two jars of 100 beads in an 85:15 ratio, the first holding 85 orange: 15 black beads and the second holding 85 black: 15 orange beads. Participants were told they would be shown a series of beads, one at a time, drawn from one of the jars, and that it was

their task to decide from which randomly chosen jar the beads were being drawn - mainly black or mainly orange. Number of draws (beads) to decision, and jar choice were recorded. The task was completed again, using a ratio of 60:40 and purple/green beads. A dichotomous outcome variable (JTC/no JTC) was derived whereby participants who made at least one decision based on two or fewer beads were considered to show the JTC bias [12, 31, 48].

2.2.3 Negative life events (The Life Events Inventory, LEI [49])

This self-report scale assesses the occurrence of thirteen types of stressful life events (including losses, disappointments, and dangers to self and others), experienced over the last year and rated for impact and chronicity. Events that had a moderately or severely undesirable impact, as determined by the participant selecting either 'quite bad/unpleasant/sad/painful' or 'very bad/unpleasant/sad or painful', and lasting for two weeks or more, were summed to provide a total negative life events score (range 0-13).

2.2.4 Emotional problems (Strengths and Difficulties Questionnaire, SDQ [50])

This self-report questionnaire comprises five subscales, of five items each, measuring emotional problems, conduct problems, hyperactivity-inattention, peer relationship problems, and prosocial behaviour over the past six months. Each item is rated: 0 (not true); 1 (somewhat true); 2 (certainly true). The emotional problems subscale was used in this study as an index of low mood and anxiety (range: 0-10; clinical cut-off: 7 and above; 6 is 'borderline'). Total Difficulties scores (range 0-40; sum of the first four subscales, excluding prosocial behaviour) were computed for sample description purposes only (Table 2).

2.3 Procedure

Approvals for the study were obtained from the Hampstead Research Ethics Committee (ref. 11/LO/0023). A member of the research team contacted families on the waiting list for the CAMHS clinical service; study information packs were mailed to parents/carers who then provided written informed consent for their child's participation. Subsequently, children provided written assent. The measures for this study were completed as part of a larger battery of assessments, over two to three meetings, with assistance provided as required from a trained researcher.

2.4 Statistical analysis

Data were analysed using the Statistical Package for the Social Sciences (SPSS version 20 [51]). Total scores were prorated if two or fewer items were missing; participants were excluded and sample sizes (n) reported if more than two items were missing. Baseline characteristics of the study sample were summarised using descriptive statistics.

The main hypotheses were tested using partial correlations derived from two series of three separate linear regression analyses. For both series, the hypothesised psychosocial processes formed the putative *dependent variables* in each of the three regression analyses: i) the JTC bias; ii) total number negative life events in the last year; and iii) the SDQ emotional problems total score. In the first series, *predictors* were UE dimensions (x 3: conviction, frequency, and distress/impact). In the second series, *predictors* were UE content/type subscales (x 5: grandiosity, hallucinations, paranormal/telepathy, paranoia, delusions/reference).

All predictors were entered simultaneously in a backward regression model, controlling for age, and gender. As neurocognitive functioning is associated with the tendency to JTC, BPVS

scores were also controlled in the JTC analyses. Partial correlations were derived for each model step; excluded variables at each step were those least associated with the dependent variable, with a p-value of >0.1. Standardised residuals did not conform to a normal distribution for the reasoning or negative life events analyses; these were checked using binary logistic regression for reasoning, for which the normalized residuals were normally distributed, and an ordinal logistic regression for negative life events. The number of steps and the final models were identical to the corresponding linear regression in each case.

3.0 Results

Of 257 families identified, initial contact was made with 134 (the remainder being unavailable to contact or leaving the service prior to contact being made). Of these, 51 declined to participate, and 83 consented. Of consenting families, 11 young people disengaged during assessment and did not complete the UE measure. Demographic and clinical characteristics of the final study sample of 72 participants are shown in Table 2.

Table 2 here

3.1 Hypothesis one: young people with reasoning biases will be characterised by higher levels of UE conviction and grandiosity

The UE *dimension* analysis, controlling for age, gender, and BPVS scores, took four steps to achieve the final model, in which only UE conviction remained significantly associated with reasoning (partial correlation=0.3, p=0.04). Of the UE *content* subscales, only grandiosity remained as a significant correlate in the final model (partial correlation=0.3, p=0.02).

3.2 Hypothesis two: young people who have experienced a higher frequency of negative life events will be characterised by higher levels of UE frequency and hallucinations

The UE *dimension* analysis, controlling for age and gender, took five steps to achieve the final model, in which UE frequency was the only significant correlate (partial correlation=0.4, $p<0.001$). For the UE *content* analysis, a final model was reached in six steps. Both hallucinations and paranoia remained in the final model, and were both significantly associated with negative life events (hallucinations partial correlation=0.3, $p=0.03$; paranoia partial correlation=0.3, $p=0.03$).

3.3 Hypothesis three: young people with more severe emotional problems (anxiety and depression) will be characterised by higher levels of UE distress/impact and paranoia

The UE *dimension* analysis, controlling for age and gender, took four steps to achieve the final model, in which UE distress/impact was the only significant correlate (partial correlation=0.5, $p<0.001$). For the UE *content* analysis, a final model was achieved in six steps. Both paranoia and hallucinations remained in the final model, and were significantly associated with emotional problems (paranoia partial correlation=0.3, $p=0.007$; hallucinations partial correlation=0.3, $p=0.04$).

Table 3 here

4.0 Discussion

We set out to examine variation in the psychosocial correlates of childhood UEs, according to their dimensions and content/type, and, thereby to determine the theoretical support for developing targeted cognitive behavioural interventions for differing UE presentations. We selected the psychosocial variables implicated in cognitive models of the development and

maintenance of psychosis, and created content/type subscales based on a five-factor structure established in similar samples using a different self-report measure. We hypothesised, based on findings in adults with psychosis, that young people evidencing particular putative psychosocial vulnerability factors would be characterised by particular patterns of UE dimensions and content such that: (i) reasoning biases would be associated with conviction and grandiosity; (ii) negative life events would be associated with frequency of occurrence and hallucinations; and (iii) emotional problems would be associated with distress/impact and paranoia. Hypothesis i) was fully supported. Young people who jumped to conclusions showed higher levels of UE conviction and grandiosity, rather than increased distress/impact or frequency of UEs, or paranoid, hallucinatory or other content. Making hasty and impulsive decisions, based on limited evidence, appears particularly linked to these characteristics of UEs, as in adult psychosis [12, 13]. For hypothesis ii), the UE dimension analysis supported the hypothesised association of frequency, rather than conviction or distress/impact, with negative life events. However, the UE content/type analysis showed associations of both paranoia and hallucinations with negative life events, and not of grandiose or other content. Findings support a role for the psychological sequelae of experiences of trauma and adversity, such as re-experiencing, hyperarousal, and avoidance, in increased frequency of UEs and the aetiology of hallucinations [19-21]. The unhypothesised link of paranoia with trauma and adversity is consistent with literature implicating negative schematic beliefs, learnt and reinforced through life experience, in the development and maintenance of paranoia [13, 18, 20, 21]. Hypothesis iii) was also partially supported. The UE dimension analysis supported the hypothesised association of distress/impact with emotional problems, but again, the UE content/type analysis showed associations of both paranoia and hallucinations with emotional problems. Findings are consistent with the involvement of mood, and affectively-driven cognitive and behavioural processes, in hallucinatory and

paranoid, rather than grandiose or other, experiences, and the increasing adverse impact of UEs, rather than their frequency or perceived veracity [12-18, 3]. Taken together, the findings broadly replicate those reported for adults with psychosis, and imply that psychological interventions for childhood UEs could be specifically targeted according to UE presentation, with the potential to improve outcomes. The findings also provide further evidence that psychological models of the onset and persistence of adult psychosis can inform our understanding of UEs in childhood, and are consistent with the delineation of discrete pathways by which transient and non-distressing UEs might develop into the distressing and persistent phenomena that are associated with increasing future mental health risk.

There are some limitations to the study. Our sample size is small for the multiple analyses carried out, limiting the power to detect smaller associations. The content factors were derived on the basis of factors delineated previously from the CAPE measure in adolescent samples [37-41] rather than our own measure comprising only nine items, which, psychometrically, has been shown to comprise a single factor [36]. Accordingly, several content/type subscales were measured by a single item only, and are therefore likely to less robustly characterise the latent construct for that content/type. Internal consistency of the paranormal/telepathy subscale, in particular, was low. The content/type subscales should not therefore be seen as a robust subdivision of the measure, but rather as a pragmatic way of establishing item groupings for the purpose of testing the study hypotheses. Future research should compare the factor structure obtained to that of an established measure, such as the CAPE, employing a larger sample.

The findings are cross-sectional, and the term ‘predictor’ is used only in a statistical sense. Findings therefore illustrate associations, and a causal direction cannot be inferred without further longitudinal research.

Clinically, the findings have important implications for intervention, suggesting that emotional processing techniques are likely to be effective in reducing the frequency of UEs, and, combined with protocols targeting emotional problems, in reducing the severity of paranoid and hallucinatory experiences. Improvements in emotional functioning may also reduce the overall adverse impact of UEs. On the other hand, reasoning-based strategies are indicated when the degree of conviction in UEs, or grandiose content of UEs, is problematic. Future studies should aim to test these targeted interventions, paralleling the development of interventions for adults with psychosis [24]. Similarly to previous studies, paranoia and hallucinatory experiences were most associated with emotional problems, supporting assertions that experiences of this kind are likely to be associated with future mental health risk [36, 52].

4.1 Conclusions

We conclude that our understanding of childhood UEs can be further informed by consideration of the dimensional attributes of UEs and their content or type. Paralleling adult models of the development of targeted therapies for clinical psychosis, our results show that interventions for childhood UEs could be similarly tailored to individual presentations. In particular, our findings suggest that reasoning interventions may be more appropriate for grandiose-type experiences, while work on emotions and trauma is more likely to be indicated for paranoid and hallucinatory experiences. This targeted approach may improve

the effectiveness of interventions to reduce current distress, adverse life impact, and future risk of mental ill health for young people troubled by their unusual experiences.

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Ethical standards: All participants gave written informed assent, with parental consent, as approved by a recognised national ethical review body.

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Table 1: Item loadings for each unusual experiences content/type grouping derived from a pragmatic confirmatory factor analysis (n=72)[a]

UE Item	*Component*				
	G	***H***	***Tel***	***P***	***DR***
1. Some people believe that their thoughts can be read. Have other people ever read your thoughts?			**0.9**		
2. Have you ever believed that you were being sent special messages through the television?					**0.9**
3. Have you ever thought that you were being followed or spied upon?	0.3	-0.3		**0.9[b]**	
4. Have you ever heard voices that other people could not hear?	0.5	**-0.9**	0.4		
5. Have you ever felt that you were under the control of some special power?	**0.7**	-0.4	0.3	0.4	0.4
6 Have you ever known what another person was thinking even though that person wasn't speaking?[3]	0.3	-0.3	**0.8**		0.5
7. Have you ever felt as though your body had been changed in some way that you could not understand?	**0.8**				0.4
8. Do you have any special powers that other people don't have?[c]	**0.8**	-0.3		0.3	
9. Have you ever seen something or someone that other people could not see?[c]		**-0.9**		0.3	
Cronbach's α	0.7	0.8	0.6	-	-

Key: UE: Unusual Experience; G: Grandiosity; H:Hallucinations; Tel: Paranormal/Telepathy; P: Paranoia; DR: Delusions/Reference. Coefficients <0.3 are suppressed. [a]Reported from the rotated structure matrix; [b]loading = 0.993; [c]n=1 missing endorsement rating replaced by the mean. Bold text denotes highest loadings for each item/items included in each subscale.

Table 2: Clinical and demographic characteristics of the sample (n=72)

Variable (Possible range)	*Mean (SD)*	
Age in years (8-14)	11.5 (1.9)	
BPVS (68% score in the range 85-115)	90.4 (16.4)[a]	
SDQ Total Difficulties (range 0-40)	16.1 (6.2)[b]	
SDQ Emotional Problems scale (range 0-10)	5.1 (2.6)[b]	
Unusual Experiences Dimensions		
Conviction (0-18)	4.5 (4.3)	
Frequency (0-27)	4.7 (4.8)	
Distress/Impact (0-54)	5.3 (6.8)	
	Mean (SD)	***n (%)***
Unusual Experiences Content		
Grandiosity (G, 0-33)	3.6 (5.5)	31 (43%)
Paranormal/telepathy (Tel, 0-22)	3.1 (3.9)	38 (53%)
Paranoia (P, 0-11)	2.3 (2.9)	34 (47%)
Delusions/reference (DR, 0-11)	0.9 (2.1)	15 (21%)
Hallucinations (H, 0-22)	4.6 (6.0)	37 (51%)
Unusual Experiences severity (0-99)	14.5 (14.7)	60 (83%)
Negative Life Events (Range 0-13)	1.4 (1.4)[c]	42 (58%)
	n (%)	
Gender (Male/Female)	48 (67%)/24 (33%)	
Ethnic background (BME/non-BME/other)	31 (44%)/34 (48%)/6 (8%)[d]	
Reasoning (JTC/no JTC)	32 (49%)/33 (51%)[e]	

Key: SD: Standard deviation; BPVS: British Picture Vocabulary Scale Standardised score (Dunn et al., 1997); SDQ: Strengths & Difficulties Questionnaire (Goodman, 2001); BME: Black and minority ethnic; JTC: Jumping to conclusions; UE: Unusual Experience; G: Grandiosity; H:Hallucinations; Tel: Paranormal/Telepathy; P: Paranoia; DR: Delusions/Reference; [a]n=71; [b]n=67; [c]n=68; [d]n=71; [e]n=65.